

Army Goes Green

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Director

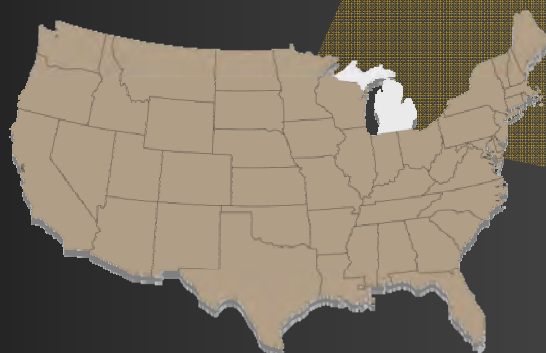
U.S Army Tank Automotive Research, Development and
Engineering Center

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 02 NOV 2011		2. REPORT TYPE		3. DATES COVERED 00-00-2011 to 00-00-2011	
4. TITLE AND SUBTITLE Army Goes Green				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S Army Tank Automotive Research, Development and Engineering Center, 6501 E. 11 Mile Road, Warren, MI, 48397-5000				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES Presented at the GreenGov Symposium, October 31 - November 2, 2011, Washington, DC					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 9	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

The Arsenal of Democracy

Strategic Relationships

- *World-Class Automotive Engineering Universities at our Doorstep*
- *Defense Industry Ground Systems Hub*
- *Direct Linkage to World-Class Automotive Research and Development Centers*
- *Strategic Engagement with 1st, 2nd and 3rd Tier Automotive Supplier Network*



The United States



Army Energy Initiatives



Fort Bliss solar panels



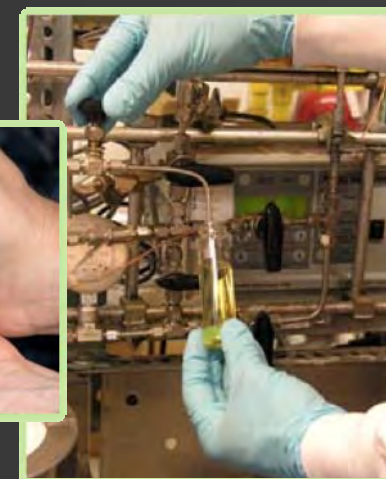
Transportable solar-powered tents



Combat boot add-on biomechanical energy harvesting device, SPaRK



Energy Harvesting Rectenna



Coal-Biomass-to-Liquids

Reducing the Fuel Logistics Burden



1 in 46
convoys suffered a casualty
in 2010, leaving some 3,000
wounded or dead

A **1%** fuel
savings will lead to

6,444
fewer Soldier trips in
dangerous battlefield
convoys

*Modeling and Simulation:
Optimize the System*



Research and Testing



*Demonstrate Systems
and Technologies*



Advancing Platform Energy Efficiency & System Knowledge

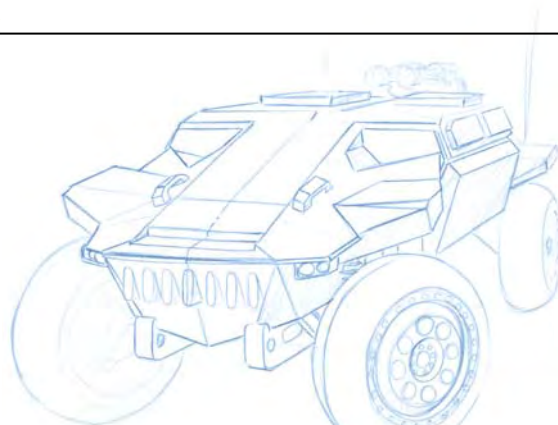
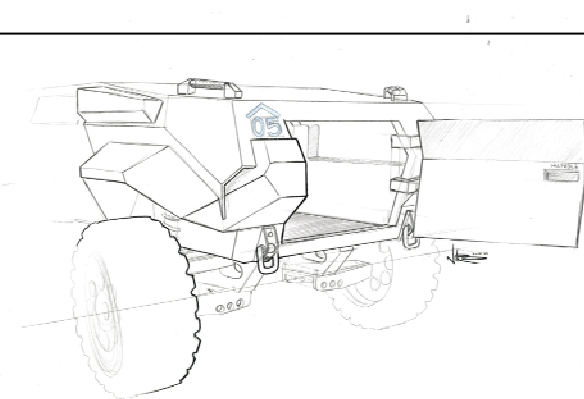


Key features

- Low-rolling-resistance tires increase fuel economy by about 7 percent
- Lightweight aluminum armored cab and underbody blast shield reduce load
- 4.5-liter inline 4-cylinder engine optimizes fuel economy
- 6-speed transmission shifts more precise

Accomplishments:

- +70% increase in fuel efficiency in both vehicles significantly exceeds original goal
- Fuel economy maximized w/in the bounds of cost, timing, threshold requirements
- Optimization improved through requirements, specifications, architecture
- Systems Engineering focus improves entire system, not component optimization



It's About Balancing Technology, Integration, Mission & Threat

Army Efforts...Integral to Installation & Operational Energy Security



Partnerships

- Hawaii Tri-Service Advanced Vehicle Working Group
- PACOM/NORTHCOM SPIDERS JCTD
- State of Hawaii
- University of Hawaii-HNEI
- Hawaii Tri-Service Military Installations

Army Involvement Achieves Goals

- Supports the increase in renewable energy
- Military as an early adopter
- Develop a competitive & sustaining industry
- **Army Hydrogen based Vehicles & Refueling**
- **Army Aloha Microgrid 1**
 - 250kW AC architecture
- **Army Aloha Microgrid 2**
 - 450kW DC modular architecture

Hawaii's Energy from Oil

90%

Hawaii Imports 51 Million Barrels of Oil Annually

\$7B

Hawaii's Supply of Oil (at any given time)

14-21 Days

Fuel Efficiency Through Autonomy

Without Soldiers in a vehicle, extensive armor isn't required – resulting in lighter, more fuel efficient vehicles.

Convoy vehicles can travel closer together, more precisely via robotics cutting down on the drag

- Makes entire Convoy more efficient

Autonomous Platform Demonstrator (APD)

- Will develop, integrate and test next-generation unmanned ground vehicle (UGV) technologies
- Technologies include hybrid-electric drive systems, advanced vehicle suspension systems, and lightweight chassis technologies on a single platform.

Convoy Active Safety Truck (CAST)

- Low-cost robotic convoy capability for current force tactical wheeled vehicles with the target cost of a robotic retrofit kit under \$20,000 per vehicle



Army/DOE Sign Charter to Achieve Vehicle Energy Efficiency



AVPTA will move us toward reducing our reliance on fossil fuels.

Combines the intellect of the DA and the DOE to accelerate energy-related R&D initiatives.

Advanced Vehicle Power Technology Alliance (AVPTA) Breaking New Ground



18 July, 2011



Joint Technology Areas

- Advanced Combustion Engines and transmission
- Lightweight Structures and Materials
- Energy Recovery and Thermal Management
- Alternative Fuels and Lubricants
- Hybrid Power Systems
- Analytical Tools

RESULTS:

The workshop resulted in:

- ✓ 37 Coordination opportunities
- ✓ 21 Opportunities for project integration
- ✓ 20 Potential joint endeavors (4 Quick Wins)

It's All About the Warfighter



Lead. Innovate. Integrate. Deliver.